86848

S/141/60/003/005/001/026
E032/E514

Determination of the Relative Fluctuations of the Electron Concentration in the Ionosphere

and radioastronomical methods. The present paper reports results of such a determination which was carried out at the Scientific Research Radiophysical Institute at Gor'kiy University in the Autumn of 1959. If it is assumed that the irregularities in the electron concentration have mean linear dimensions ξ and are distributed uniformly throughout the ionospheric layer, then in the case of radioastronomical observations δN is given by

$$\delta N = 0.34 \frac{\lambda_c^2}{\lambda_o \sqrt{\xi \bar{z}_m}} \sqrt{\ln\left(\frac{P_s}{P} + 1\right)} \qquad (1)$$

while in the pulse method it can be estimated from the inequality given by Eq. (2), where λ_o and λ_c are the working and critical wavelength respectively and $\bar{z}_m$ is the effective

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E032/E314

Determination of the Relative Fluctuations of the Electron Concentration in the Ionosphere

thickness of the ionosphere P_s/P is the ratio of scattered to transmitted signal energies and I is an integral depending on the parameters of the layer. The expression

$$\delta N < 0.17 \frac{\lambda_o}{\sqrt{\xi I}} \sqrt{\ln\left(\frac{P_s}{P} + 1\right)} \qquad (2)$$

holds for a signal which has been reflected only once. In the case of double reflection the inequality

$$\delta N < 0.17 \frac{\lambda_o}{\sqrt{\xi I}} \sqrt{\frac{1}{2} \ln\left(\frac{P_s}{P} + 1\right)} \qquad (3)$$

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must be employed. The above formulae were derived on the assumption that
1) the relative fluctuations in the dielectric constant are small,
2) the angles of scattering ϑ are small ($\ll 1$),
3) the geometrical-optics approximation holds and
4) the point of observation is at a great distance from the scattering region.
It was also assumed that the dependence of the concentration on altitude is given by

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Determination of the Relative Fluctuations of the Electron Concentration in the Ionosphere

$$N = \begin{cases} N_o\left[1 - \left(\dfrac{z - z_o}{z_m}\right)^2\right] & (z < z_o) \\ N_o \exp\left[\alpha(z - z_o)\right] & (z > z_o) \end{cases} \quad (4)$$

X

where z_o is the altitude of the maximum

N_2 is the electron concentration at $z = z_o$.

Under these conditions the effective thickness of the ionosphere is given by

$$\dot{z}_m = z_m + 1/\alpha .$$

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In the calculations z_m was assumed to be equal to 400 km.

The dimensions of the irregularities ξ were estimated from the formula $\xi = VT$ where T is the mean period of fluctuations and V is the velocity of motion of the irregularities. In calculating ξ it was assumed that these irregularities move with a mean velocity of 100 m/sec. The integral I was calculated in Ref. 3. It was found that the pulse method gives $\delta N < 4 \times 10^{-3}$ and $\delta N < 10^{-2}$ for the F and E layers, respectively. Fluctuations in the emission of discrete sources (Cassiopea A and Cygnus A) gave the value of $\delta N \sim 3 \times 10^{-3}$. Acknowledgments are expressed to V.L. Ginzburg and G.G. Getmantsev for their interest and valuable advice.

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Determination of the Relative Fluctuations of the Electron Concentration in the Ionosphere

There are 5 references 4 Soviet and 1 English

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysical Institute of Gor'kiy University)

SUBMITTED: June 6, 1960

Card 7/7

9.7120 (also 1041, 1046)
9.9400

S/141/60/003/006/004/025
E032/E114

AUTHORS: Mityakova, E.Ye., Mityakov, N.A., and Rapoport, V.O.

TITLE: On the Measurement of the Electron Concentration in the Ionosphere and in Interplanetary Space

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol.3, No.6, pp. 949-956

TEXT: A brief review is given of the available methods for the determination of the electron concentration in the ionosphere with the aid of artificial earth satellites. Using the quasi-longitudinal approximation, an expression is obtained for the phase and group paths for a signal emitted from an artificial earth satellite towards a spherical earth. It is shown using the results of Al'pert et al (Ref.11) that the phase path length is given by

$$n^2_{1,2} = 1 - \frac{4\pi e^2 N}{m\ \omega(\omega \pm \omega_L)} = 1 - \frac{2aN}{\omega(\omega \pm \omega_L)} \qquad (1)$$

and

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S/141/60/003/006/004/025
E032/E114

On the Measurement of the Electron Concentration in the Ionosphere and in Interplanetary Space

$$L_{\phi 1,2} = r_0 - \frac{a}{\omega\cos\chi}\left[\int_0^{z_0}\frac{N}{\omega \pm \omega_L}\,dz - \mathrm{tg}^2\chi\int_0^{z_0}\frac{Nz}{R_0(\omega \pm \omega_L)}\,dz\right]. \quad (5) \qquad (5)$$

and the group path length is given by

$$L_{rp1,2} = \int_A^B \frac{\partial\,(n_{1,2}\,\omega)}{\partial\,\omega}\,d\ell_{1,2} \qquad (6)$$

and

$$L_{rp1,2} = r_0 + \frac{a}{\omega\cos\chi}\left[\int_0^{z_0}\frac{N}{\omega \pm \omega_L}\,dz - \mathrm{tg}^2\chi\int_0^{z_0}\frac{Nz}{R_0(\omega \pm \omega_L)}\,dz\right]. \quad (7) \qquad (7)$$

In these expressions $\omega_L = (eH_0/mc)\cos\gamma$, γ is the angle between the earth's magnetic field and the wave normal, suffix 2 and the "minus" sign refer to the ordinary wave, and suffix 1 and

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On the Measurement of the Electron Concentration in the Ionosphere and in Interplanetary Space

the "plus" sign to the extraordinary wave. Furthermore, N is the electron concentration, z_o is the distance from the earth's surface, r_o is the true distance from source to receiver, R_o the earth's radius, and χ is the zenith angle of the satellite (see Fig.1). These two path lengths differ from the true distance r_o by the same amount $\delta_{1,2}$. The above expressions can be used in a method whereby the electron concentration is determined by measuring the angle between the planes of polarization and the difference between the group path lengths on two frequencies. The combination of these two measurements is suggested as a possible approach to the measurement of the electron concentration in interplanetary space with the aid of cosmic rockets. To measure the electron concentration in interplanetary space it is necessary to have signals on frequencies ω_1, ω_2, ω_3 which are modulated at a low frequency Ω. The close frequencies ω_1 and ω_2 can be used to measure the Faraday effect and hence the contribution to

$$\int_0^{r_o} N\,dr$$

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On the Measurement of the Electron Concentration in the Ionosphere and in Interplanetary Space

due to the ionosphere, and the distant frequencies ω_1 and ω_3 to measure the difference in the group path lengths. In order that the contribution due to interplanetary space should be comparable to that due to the ionosphere, the rocket must be at a distance of 10^6 km from the earth. The reception of signals from such distances is difficult because of the low power of the transmitters on rockets. This difficulty can easily be avoided by the use of a sinusoidally modulated signal.

Acknowledgments are expressed to G.G. Getmantsev and V.L. Ginzburg for valuable advice.

There are 1 figure and 14 references: 6 Soviet and 8 non-Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of the Gor'kiy University)

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SUBMITTED: April 2, 1960

21166

S/141/60/003/006/005/025
E032/E114

9,9100 (also 1041, 1046)

AUTHORS: Benediktov, Ye.A., Korobkov, Yu.S., Mityakov, N.A., Rapoport, V.O., and Khodaleva, L.N.

TITLE: Results of Measurements of the Absorption of Radio Waves in the Ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy Radiofizika, 1960, Vol.3, No.6, pp. 957-968

TEXT: Results obtained at Gor'kiy in 1959 are reported. The total absorption in the ionosphere was measured with the aid of the "method of two frequencies". The method is described as follows. Suppose that the cosmic radio emission is received simultaneously on two frequencies f_1 and f_2 where $f_2 > f_1$. For each of these frequencies the integral absorption of radio waves in the ionosphere is given by:

$$\Gamma_i = \ln (I_{0i}/I_i), \tag{1}$$

where I_{0i} and I_i are the intensities of cosmic radio emission of frequency f_i before and after passage through the

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ionosphere. If $(2\pi f_1)^2 \gg \nu^2$ and $f_1^2 \gg f_c^2$, where ν is the effective number of collisions of electrons with ions and neutral molecules, and f_c is the critical frequency of the F-layer, then the integral absorption is given by:

$$\Gamma_i = \frac{e^2}{\pi m c f_i^2} \int_0^z N \nu \, dz \tag{2}$$

In this expression N is the electron concentration, z is the thickness of the absorbing layer, e and m are the charge and mass of the electron, and c is the velocity of light. It then follows that $\Gamma_1/\Gamma_2 = (f_2/f_1)^2$ and hence, finally, the integral absorption for each of the frequencies is given by

$$\Gamma_1 = \frac{\ln (I_{02}/I_{01}) - \ln (I_2/I_1)}{1 - f_1^2/f_2^2} \tag{3a}$$

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Results of Measurements of the Absorption of Radio Waves in the Ionosphere

and $$\Gamma_2 = \Gamma_1 (f_1/f_2)^2 \tag{3b}$$

If I_{02}/I_{01} does not depend on the galactic coordinates then changes in Γ_i with time depend only on the ratio of the two frequencies. In fact, the above intensity ratio is not independent of the galactic coordinates but this fact should not lead to large errors in the absorption measurements. Published data on the absorption of radio waves in the ionosphere during night hours shows that the absorption is frequently negligible. If the intensity ratio I_{02}/I_{01} is determined for these hours, then the absorption for any other time can be calculated from Eq. (3). It may be shown that the optimum frequency range for the above method differs from the standard method (described by Blum et al. in Ref.2 and Mitra and Shain in Ref.3) in that it does not require highly specialized apparatus or prolonged observations. The present authors have used the above method between August and

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Results of Measurements of the Absorption of Radio Waves in the Ionosphere

December 1959 on 8.6 and 25 Mc/s. The results obtained show that the absorption has a characteristic maximum at noon each day, and a minimum at about 4 hrs. In August and September there is also an additional evening maximum at about 20 hrs. The magnitude of the noon maximum was found to be 1.1 db in August, 1.15 db in September, 1.2 db in October and November, and 1.6 db in December (on 18.6 Mc/s throughout). Fig.4 shows the diurnal dependence of the total absorption (continuous curve) and the absorption in the lower layers of the ionosphere (dotted curve) averaged over the periods 23rd to 31st October (Fig.4a) and 12th to 15th November (Fig.4б). The results obtained by the Radio Astronomical methods were checked by means of the pulse method described by Pigott et al. (Ref.9). Fig.5 shows the dependence of the absorption in the F-layer on the critical frequencies of the F layer (18.5 Mc/s) (curve I - 12th to 15th November; curve II - 20th to 31st October; curve III - data from Ref.3). Acknowledgements are expressed to G.G. Getmantsev and V.L. Ginzburg for interest and advice.

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S/141/60/003/006/005/025
E032/E114

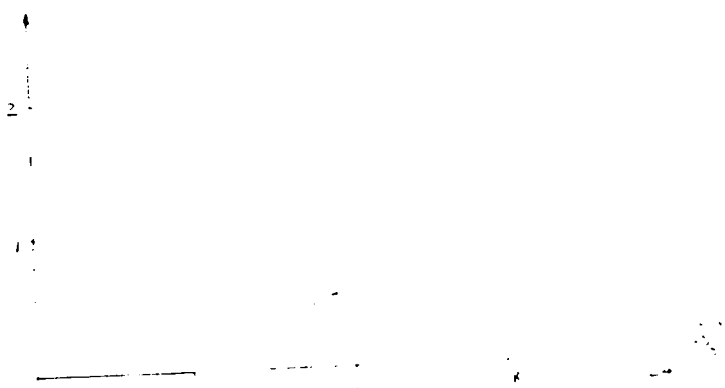
Results of Measurements....

There are 5 figures and 13 references: 5 Soviet and 8 non-Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of the Gor'kiy University)

SUBMITTED: May 10, 1960

Fig.4a



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Results of Measurements of the Absorption of Radio Waves in the Ionosphere

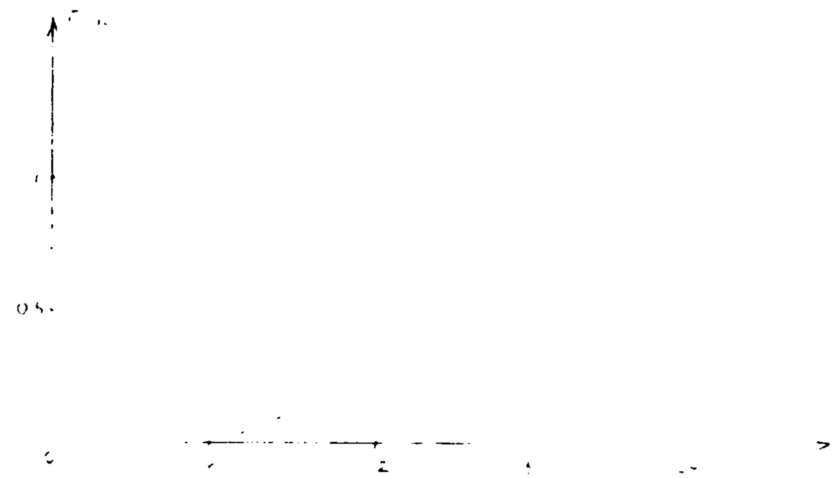

Fig.46

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Results of Measurements of the Absorption of Radio Waves in the Ionosphere

Fig.5

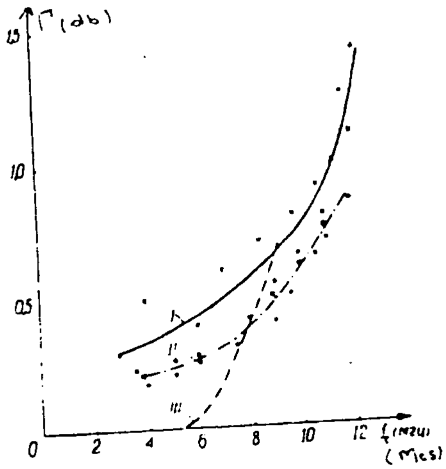

Рис. 5 Зависимость поглощения в слое F от критических частот слоя F (частота 18,6 мгц): I – для 12–15 ноября, II – для 20–31 октября, III – из работы [?]

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S/141/61/004/001/003/022
E032/E314

9,9100

AUTHORS: Benediktov, Ye.A. and Mityakov, N.A.

TITLE: On the Absorption of Cosmic Radio Emission in the Ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1961, Vol. 4, No. 1, pp. 44 - 48

TEXT: When radio waves are incident normally on the ionosphere, then for frequencies much greater than the critical frequency the absorption of these waves in the ionosphere is given by (Ginzburg - Ref. 5)

$$\Gamma = 4,34 \frac{e^2}{\pi mcf^2} \int_0^\infty N\nu\, dz = 1,16 \cdot 10^{-2} f^{-2} \int_0^\infty N\nu\, dz \quad (\partial б), \qquad (1)$$

where e and m is the charge and mass of the electron,
c is the velocity of light,
f is the frequency,

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N is the electron concentration and
ν is the effective collision frequency..

It is known (Ref. 5) that the effective collision frequency ν is determined by collisions with neutral molecules up to 150 km, while in the F-layer it is determined by collisions with ions. The magnitude of $N\nu$ can be estimated from known values of N and ν in the lower ionosphere (Nicolet - Ref. 6, Kane - Ref. 7 and Nertney - Ref. 8). These data are given in Table 1. Numerical estimates of absorption using Eq. (1) and the data in Table 1 show that the absorption in the lower layers of the ionosphere on 18.6 Mc/s is 0.3 - 0.5 db at mid-day, which is in agreement with the experimental data reported by Benediktov et al (Ref. 3). In the F-layer, the effective collision frequency is given by (Ref. 5)

$$\nu = \frac{5{,}5N}{T^{3/2}} \ln \left(220 \frac{T}{N^{1/3}}\right), \qquad (2)$$

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where T is the electron temperature. In approximate calculations it may be assumed that $T = 1\ 000\ ^{\circ}K$ and $N = 10^6$ and hence one obtains the approximate expression

$$\nu = \frac{45N}{T^{3/2}} \qquad (2a)\ .$$

Substituting Eq. (2a) into Eq. (1), we have the following expression for the absorption in the F-layer

$$\Gamma_F = 0.52\ f^{-2} \int \frac{N^2}{T^{3/2}} dz \qquad (3)\ .$$

The electron concentration N is a maximum at 300 km while the temperature in the F-layer increases monotonically with

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height. Since N^2 changes with height much more rapidly than $T^{-3/2}$, the above expression can be approximated by

$$\Gamma_F \approx 0.52\, f^{-2} T_o^{-3/2} \int N^2 dz \quad (3a)$$

where $T_o^{-3/2}$ is an average value of $T^{-3/2}$. The electron concentration in the F-layer on the first approximation is given by (Al'pert - Ref. 9)

$$N = \begin{cases} N_0 \left(1 - \dfrac{z^2}{z_1^2}\right) & (z < 0) \\ N_0 \exp\left(-\dfrac{z}{z_2}\right) & (z > 0) \end{cases} \quad (4)$$

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where N_o is the electron concentration in the maximum of the layer. It then follows that

$$\int_{-z_1}^{\infty} N^2 dz = \frac{N_0^2}{2}\left(z_2 + \frac{16}{15} z_1\right) \qquad (5)$$

and hence

$$\Gamma_F = 0{,}26 f^{-2} T_e^{-1} N_0^2 \left(z_2 + \frac{16}{15} z_1\right). \qquad (6)$$

Assuming standard values for the F-layer ($N_o = 10^6$, $f_c \sim 9$ Mc/s, $z_1 = 150$ km, $z_2 = 300$ km and $T_o = 1\ 000\ ^oK$), we find that at $f = 18.6$ Mc/s, the absorption $\Gamma_F = 1.1$ db. This is also in agreement with experimental data reported in Ref. 3. Thus, the integral absorption of radio waves in the ionosphere on frequencies considerably in excess of the critical frequency is

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On the Absorption ....

largely determined by absorption in the F-layer. Eq. (6) can also be used to determine the temperature T_o near the maximum of the F-layer. Assuming that $N_o = 1.24 \times 10^{-8} f_c^2$, it is found that

$$\int N dz = 1.24 \times 10^{-8} f_c^2 z_{эфф} \tag{7}$$

where the effective thickness of the atmosphere is given by

$$z_{эфф} = z_2 + \frac{2}{3} z_1 \tag{8}$$

Using Eqs. (6)-(8), one finds that

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$$T_0 = \left(\frac{3,1 \cdot 10^9}{\int Ndz + 5 \cdot 10^{-9} z_1 f_c^2} \frac{f^2}{f_c^2} \Gamma_p \right)^{-2/3} \qquad (9)$$

Using the experimental data (Ref. 3) on the absorption in the F-layer on 18.6 Mc/s, one can calculate the product $T_0^{-3/2} z_{эфф}$. In fact, using Eqs. (6)-(8), it turns out that

$$T_0^{-3/2} z_{эфф} \left(1 + 0.4 \frac{z_1}{z_{эфф}}\right) = 2,5 \cdot 10^{16} \frac{f^2}{f_c^2} \Gamma_p \qquad (11)$$

Usually, the second factor in the brackets in Eq. (11) can be neglected. Table 2 gives the various parameters for October, 1959, as calculated from the above formulae. It is pointed out that simultaneous measurement of absorption in the F-layer and the total electron concentration $\int Ndz$ can provide

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reliable information on the temperature near the maximum of the F-layer and its variation with time. Acknowledgments are expressed to V.L. Ginzburg and F.F. Getmantsev for their advice and interest. There are 2 tables and 9 references: 4 Soviet and 5 non-Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of Gor'kiy University)

SUBMITTED: June 6, 1960

Card 8/10

9,9100

S/141/61/004/006/003/017
E032/E114

AUTHORS Vodeneyeva, D K., and Mityakov, N A

TITLE Results of experimental studies of the triple-splitting effect in the F-layer of the ionosphere

PERIODICAL Izvestiya vysshikh uchebnykh zavedeniy Radiofizika v 4, no.6, 1961 1013 1019

TEXT The anisotropy of the ionosphere is usually responsible for the appearance of at least two branches on the F-layer ionograms and these are due to the ordinary and the extraordinary waves. Frequently, however, one observes an additional branch which is referred to as the z-component or the triple-splitting effect. The present authors report results of experimental studies of the latter effect in the F-layer. The observations were carried out in March 1961 at Gor'kiy. The results are in complete agreement with those reported by G R Ellis (Ref 3: J. Atm Terr Phys v 3, 263 (1953), v 8 43 (1956)) It is established that the reason for the appearance of the z-component is the interaction between

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obliquely incident radio waves with the radio waves which are back scattered by ionospheric irregularities. Acknowledgments are expressed to V.L. Ginzburg, G.G. Getmantsev, L.A. Skrebkova and V.O. Rapoport for their assistance in this work. N.G. Denisov is mentioned in the article.

There are 3 figures and 7 references: 3 Soviet-bloc and 4 non-Soviet-bloc. The 4 English language references read as follows:

Ref.3: in text above.
Ref.2: G.C.W. Scott, J.Geophys.Res., v.55, 64 (1950).
Ref.6: B. Landmark, J.Atm.Terr.Phys., v.2, 254 (1952).
Ref.7: R. Satyanarayana, J.Atm.Terr.Phys., v.13, 201 (1959).

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete
(Scientific Research Radiophysics Institute at Gor'kiy University)

SUBMITTED: June 8, 1961

B

MITYAKOV, N.A.; RAPOPORT, V.O.

Possibility for measuring the electron concentration in the upper ionosphere and in interplanetary space on the basis of plasma wave radiation. Izv. vys. ucheb. zav; radiofiz. 5 no.3:464-467 '62. (MIRA 15:7)

1. Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete.
(Electrons) (Ionosphere) (Outer space)

MITYAKOV, N. A.

Field frequency of an oscillator moving in an anisotropic medium. Izv. vys. ucheb. zav.; radiofiz. 5 no.5:892-896 '62. (MIRA 15:10)

1. Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete.

(Oscillators, Electric) (Plasma(Ionized gases))

MITYAKOV, N.A.; MITYAKOV, E.Ye.; CHEREPOVITSKIY, V.A.

Results of radio observations from the artificial satellites "Kosmos 1" and "Kosmos 2" in the Crimea. Geomag. i aer. 3 no. 5:816-822 S-0 '63. (MIRA 16:11)

1. Radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete.

MITYAKOV, N.A.; MITYAKOVA, E.Ye.

Methodology of studying the ionospheric structure by way of ground reception of radio signals [redacted]. Geomag. i aer. 3 no.5:858-867 S-O '63. (MIRA 16:11)

1. Radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete.

MITYAKOV, N.A.

Letter to the editor. Izv. vys. ucheb. zav.: radiofiz. [illegible] ([illegible]) [illegible]

(No subject headings)

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L 6846-65 EWT(d)/EWT(1)/EEC(k)-2/EWG(v)/FCC/EEC-4/EEC(t)/EEC(c)-2/EWA(h)/FSS-2 AFETR/ASD(m)-3/SSD/ Pb-4/Po-4/Pc-4/Ps-5/Pq-4/Pa-4/Pg-4/Pae-2/Pt-10/Pi-4/Pl-4 ~~ASD(p)-3/BSD/ESD(dp)/ESD(c)/ESD(t)~~/RAEM(t) AFMD(t)/RAEM(a)/ASD(a)-5/AFTCA/AFWL/AS(mp)-2/ S/0141/64/007/003/0556/0559

ACCESSION NR: AP4044111 129

128

AUTHORS: Yerukhimov, L. M.; Mityakov, N. A.

TITLE: Some methods of ionosphere research by diversity reception of signals from artificial earth satellites

SOURCE: IVUZ. Radiofizika, v. 7, no. 3, 1964, 556-559

TOPIC TAGS: ionospheric radio wave, diversity reception, artificial earth satellite, electron concentration, phase measurement

ABSTRACT: The authors discuss briefly some methods for determining ionospheric parameters, based on diversity reception of signals from artificial satellites. These methods are based on calculations of the optical path length of the radio wave in the ionosphere, with allowance for Snell's law and with corrections for the horizontal gradients of the electron concentration. The use of the Faraday method in conjunction with diversity reception yields the horizontal

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ACCESSION NR: AP4044111

components of the phase difference between the ordinary and extra-ordinary wave and consequently the integral gradients of the electron concentration in the direction of the line joining the two antennas. Measurements of the phase difference of coherent frequencies at two separate points makes it possible to determine directly the regular and irregular horizontal gradients of the electron concentration in a direction perpendicular to the plane of incidence of the wave. Estimates show that the necessary measurement base at 20 and 90 Mcs should be of the order of several hundred meters. It is noted in a postscript that experimental data obtained by diversity reception of signals from the satellite "Kosmos-1" disclose the presence of large inhomogeneities (larger than 500 km) with horizontal gradients exceeding 10^5 electron/cm^2, causing appreciable shifts in the Faraday fadings even when the antennas are separated by a distance on the order of 1 km. Orig. art. has: 10 formulas and 1 figure.

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L 6846-65
ACCESSION NR: AP4044111

ASSOCIATION: Nauchno issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute at the Gor'kiy University)

SUBMITTED: 02Jul63 ENCL: 00

SUB CODE: EC NR REF SOV: 005 OTHER: 000

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L 2965-66 EWT(d)/FSS-2/EWT(l)/FS(v)-3/EPA(sp)-2/EEC(k)-2/FSS/EWA(d)/EWA(h)

ACCESSION NR: AT5023576 AST/TT/GS/GW UR/0000/65/000/000/0147/0150

AUTHOR: Yerukhimov, L. M.; Mityakov, N. A.; Mityakova, E. Ye. 69 B+1

TITLE: Investigation of the ionosphere by the method of ground reception of radio signals from artificial earth satellites

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 147-150

TOPIC TAGS: ionosphere, ionospheric inhomogeneity, electron density, artificial satellite observation

ABSTRACT: A summary of research on the regular ionospheric structure, large-scale inhomogeneities of electron concentration, and small-scale ionospheric inhomogeneities is presented. The research in question has been conducted since 1961 using artificial earth satellites (Elektron-1 included). The regular structure of the ionosphere was studied by the measurement of the phase difference of coherent frequency signals (20—90 Mc) and the Faraday fading of 20-Mc signals from the satellites. According to data from Cosmos-1, Cosmos-2, and Explorer-7, electron concentration

Card 1/2

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R001134810003-0"

L 2965-66

ACCESSION NR: AT5023576

O

as a function of the altitude of the satellite and the time of day was in the range $0.1—1.7 \times 10^{13}$ el/cm^2. The corresponding average value for the exponent index k was 6.2×10^{-3}/km. The index was determined from comparisons with vertical probing data under the assumption that the electron concentration above the F layer behaves exponentially. The measurements of large-scale inhomogeneities indicated that their dimensions range from a few kilometers to a few hundred kilometers. The gradient

$$\Delta \int_0^{l_0} \frac{\partial N}{\partial s} ds \approx 10^4 \text{ el/cm}^3$$

is independent of the nonuniformity dimension l for $l > 100$ km. For $l < 100$ km, this gradient increases with l. Small-scale inhomogeneities were determined from the fluctuation of signals received at three spatially dispersed antennas. It was established that they have a clearly expressed daily course, with the maximum occurring at night. They were observed primarily at 250—350 km and ranged in size from 1 to 2 km. Orig. art. has: 1 formula. [BD]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: ES, EC

NO REF SOV: 008 OTHER: 001 ATD PRESS: 4109

Card 2/2 BVK

L 5315-66 EWT(d)/FBD/FSS-2/EWT(l)/FS(v)-3/EEC(k)-2/EWA(d) AST/TT/RB/GS/GW/WS-2
ACCESSION NR: AT5023642 UR/0000/65/000/000/0581/0606

AUTHORS: Benediktov, Ye. A.; Getmantsev, G. G.; Mityakov, N. A.; Rapoport, V. O.; Sazonov, Yu. A.; Tarasov, A. F.

TITLE: Results of the intensity measurements of radio-frequency radiation at frequencies of 725 and 1525 kc by means of the apparatus installed in the satellite Elektron-2

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 581-606

TOPIC TAGS: artificial earth satellite, radio emission, ionosphere, atmospheric radiation, radio receiver, geomagnetic field

ABSTRACT: The results of radio-frequency measurements taken by the Elektron-2 satellite are analyzed and the equipment used is described. Two fixed-frequency receivers tuned to 725 and 1525 kc were used with a common dipole antenna. One side of the antenna was a 3.75-m metal stub, and the other side was the body of the satellite; the radiation resistance was 0.033 ohm for 725 kc and 0.146 ohm for 1525 kc for a capacitance of 46 pF. The receivers used straight amplification with 3 rf

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L 5315-66
ACCESSION NR: AT5023642

21

stages and 2 af stages. The error in the absolute value of the intensity of cosmic radio emission was ± 30% for 1525 kc and (+30, -50)% for 725 kc. The measurement results were processed by converting the output voltages to the effective temperature of radio emission. Values of effective temperature T_{eff} for a 2-hr flight near the apogee are given in Fig. 1 on the Enclosure, where the points correspond to 1525 kc and the crosses to 725 kc. All of the data on the spectrum of cosmic radio emission indicate that for f ≲ 3-5 Mc its intensity decreases with frequency. The profile of the electron concentration in the ionosphere was determined from its effect on radiation resistance and capacitance of the antenna. A graph of electron concentration N versus altitude h is shown in Fig. 2 on the Enclosure. Sporadic radio emission from the earth's atmosphere considerably exceeding the cosmic radio emission in intensity was recorded at both frequencies. A correlation between radio emission and the intensity of soft-electron flux is found. The distribution of radio emission indicates that electron fluxes penetrate the ionosphere primarily at latitudes of 30-50°. The authors thank Yu. V. Abramov, A. A. Andronov, B. N. Boykin, V. L. Ginzburg, V. V. Zheleznyakov, V. S. Karavanov, Yu. I. Logachev, G. A. Skuridin, and V. Yu. Trakhtengerts for aid in preparing the experiment and discussion of the results. Orig. art. has: 14 graphs, 1 diagram, 1 chart, 3 tables, and 11 formulas.

Card 2/5

L 5315-66
ACCESSION NR: AT5023642

2

ASSOCIATION: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva, Moscow (All-Union Conference on Space Physics)

SUBMITTED: 02Sep65 ENCL: 02 SUB CODE: ES, NP

NO REF SOV: 014 OTHER: 007

Card 3/5

L 5315-66
ACCESSION NR: AT5023642

ENCLOSURE: 01

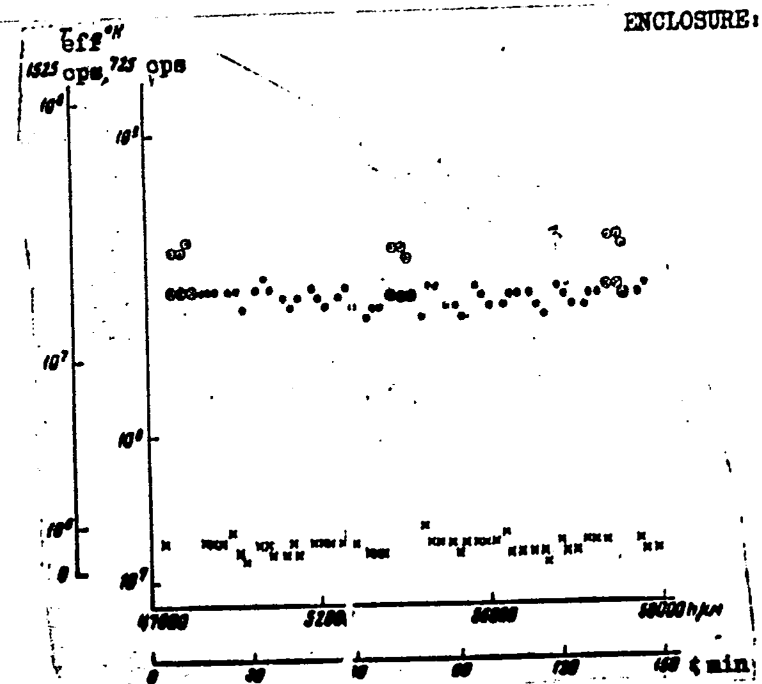

Fig. 1. Effective temperature versus time

Card 4/5

L 5315-66

ACCESSION NR: AT5023642

ENCLOSURE: 02

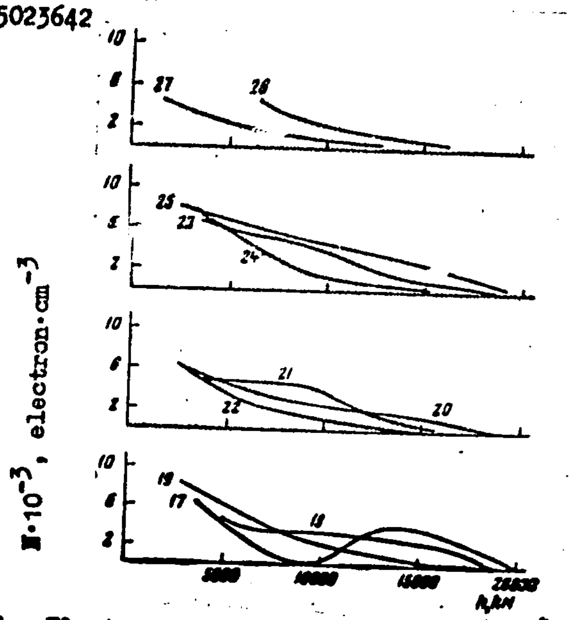

Fig. 2. Electron concentration versus altitude

Card 5/5

L 65295-65 EWT(d)/EWT(1)/FS(v)-3/FSS-2 TT/AST/GW

ACCESSION NR: AP5021255

UR/0293/65/003/004/0618/0629
629.195.2:621.39

AUTHORS: Getmantsev, G. G.; Kalashnikov, N. I.; Bykov, V. L.; Benediktov, Ye. A.; Yerukhimov, B. M.; Belikovich, V. V.; Bakhnin, V. M.; Kantor, L. Ya.; Korobkov, Yu. S.; Kunilov, M. V.; Mityakov, N. A.; Pusyrev, I. M.; Rapoport, V. O.; Sigalov, A. G.; Cherepovitskiy, V. A.; Akim, E. A.

TITLE: The results of an experiment on radio communications via "Echo 2" and the moon at a frequency of 162.4 megacycles between the observatories of Jodrell Bank and Zimenki

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 4, 1965, 618-629

TOPIC TAGS: moon, satellite communication, radio telescope, radio transmission, satellite tracking, scientific research coordination / Jodrell Bank radio telescope, Zimenki observatory radio telescope, BESM 2 electronic computer

ABSTRACT: During February-March 1964 the Academy of Sciences of the SSSR, NASA of the USA, and the General Post Office Department of Great Britain conducted an experiment to establish one-way radio communication at 162.4 megacycles via the passive satellite "Echo-2" and the moon. Echo-2 was used for 34 communication

L 65295-65

ACCESSION NR: AP5021255

tests of 10-15 minutes (the time interval permitted by Echo's orbit), and the moon was used for 15 test runs between the Echo tests. The transmitting equipment at Jodrell Bank and the receiving unit of the Zimenki Observatory are described in detail. Echo orbit information furnished by NASA, visual observations, and radio tracking data from fixed stations were fed to a BESM-2 electronic calculator which provided programmed tracking control. The received signal exhibited strong fluctuations separable into two periods: 1) a 1-2 minute fluctuation associated with Echo-2 distortion from a sphere and with tracking errors; 2) a 3-10 second period associated with small surface irregularities. The rapid fluctuations varied with each test. Voice signals, slowed by a factor of 8, were barely intelligible. Telegraph, teletype, and photofacsimile transmission, in general, were unsatisfactory, but in periods of high signal-to-noise ratios intelligible messages were received. The moon transmissions were not as clear but did furnish scientific information. Unexpected transmission losses included 3-5 db for polarization losses and 1-2 db for unknown causes. The international cooperation was excellent, with the Soviet submitting a complete report. Offers for further cooperation have been extended. Orig. art. has: 3 tables, 7 figures, and 4 formulas.

ASSOCIATION: none

SUBMITTED: 18Apr65 ENCL: 00 SUB CODE: AA, EC

NO REF SOV: 000 OTHER: 002

Card 2/2

L 23430-66 EWT(d)/FSS-2/EWT(1)/EEC(k)-2/FCC/EWA(d)/EWA(h) AST/TT/GW

ACC NR: AP6012830 SOURCE CODE: UR/0293/66/004/002/0249/0256

47

AUTHOR: Mityakov, N. A.; Mityakova, E. Ye.; Cherepovitskiy, V. A. 41

ORG: none B

TITLE: Results of a study of the distribution of electron concentration in the ionosphere by a method of ground reception of radio signals from Electron-1

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 2, 1966, 249-256

TOPIC TAGS: ionosphere, ionospheric electron concentration/Electron 1

ABSTRACT: The total electron concentration in the ionosphere above the maximum of the F layer was determined from ground reception of signals of Electron-1 transmitted at 20.005 and 30.0075 Mc. Observations were made during February—March 1964 at Gorky and in the Crimea with equipment capable of recording the phase difference of coherent-frequency signals. Standard PKCh-3 equipment, described earlier by Ya. L. Al'pert et al., was employed in the Crimea, while special equipment capable of recording signal amplitudes and phase differences at coherent frequencies of 20, 30, 40, and 90 Mc was developed for use at Gorky. Standard R-250 M receivers were employed. Signals from a coherent reference heterodyne were also fed to the receivers. In the presence of satellite signals, low-frequency beats were generated at the output of the receivers. After passing through narrow-band filters, the low-frequency signals were fed to a phase meter, where they were brought to a single frequency of 9 kc. On the basis of recorded phase differences, total electron concentration was

Card 1/3 UDC: 550.388.1

2

determined to altitude z_c of the satellite from the following formula:

$$N_{nc} = \int_0^{z_c} N dz,$$

where N_{nc} is the vertical profile of the ionosphere passing through a point at which radio beams intersect with the maximum of the F layer. Curves showing the diurnal variation of N_{nc} for various intervals of geographic latitudes are given in the

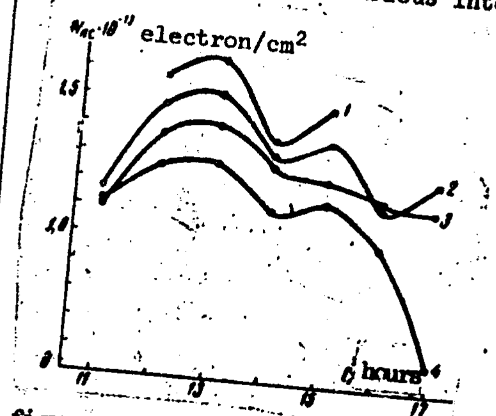

Fig. 1. Diurnal variation of the electron concentration for various geographic latitudes

1 - 51—53°; 2 - 53—55°; 3 - 55—57°; 4 - 57 to 60°.

figure. The total electron concentration was found to increase in the southward

L 23430-66

ACC NR: AP6012830

8

direction. In conclusion, the authors avail themselves of the opportunity to thank T. I. Makarov and S. K. Malyshev for their participation in the development and preparation of the equipment; L. M. Barsukov, V. A. Vasin, and L. I. Grekov for their assistance in processing the material; and L. V. Piskunov and A. V. Potemkin for computing the ephemerides of the satellites. Orig. art. has: 6 figures and 1 table.

[JR]

SUB CODE: 04, 17/ SUBM DATE: 05Jun65/ ORIG REF: 006/ OTH REF: 005/ ATD PRESS: 4236

Card 3/3

MITYAKOV, V.I.

Device for dumping the bucket of the UBK-5 crane in conveying concrete mix. Rats. i izobr. predl. v stroi. no. 75:7-8 '53. (MLRA 7:7)
(Concrete) (Cranes, derricks, etc.)

FA 43/49T48

MITYAKOV, V. S.

Oct 49

USSR/Engineering
Steam Boilers
Scale Removal

"Experiment in Washing Fire-Tube Steam Boilers With Hydrochloric Acid," V. S. Mit'akov, Engr, [illegible]

"Za Ekonomiyu Topliva" Vol V, No 10

Describes experiment in removing boiler scales from steam boilers with weak solutions of hydrocloric acid. Method should be used only once or twice on any one boiler.

43/49T48

[illegible], [illegible]

[illegible] Vnutrikotlovoy [illegible]
torliva, [illegible]

[illegible]

GRINBOYM, M.Ya.; GUTOROV, V.G., ZHILYAYEV, A.V., KASATKIN, V.N.; LEVIN, P.V. [deceased], MITYAKOV, V.S., OKOROKOV, A.A.; USHAKOV, P.N.; BURKOV, G.A., laureat Stalinskoy premii, redaktor [deceased]; AYZENSHTAT, I.I., redaktor; FRIDKIN, A.M., tekhnicheskiy redaktor.

[Handbook on boiler inspection] Spravochnik po kotlonadzoru. Izd. 2-e, perer. Pod obshchei red. G.A.Burkova. Moskva, Gos. energ. izd-vo, 1954. 568 p.[Microfilm] (MLRA 8:2)
(Boilers--Inspection)

L 8950-65 EWT(d)/FSS-2/EWT(1)/EEC(k)-2/EWG(v)/FCC/EEC-4/EEC(t)/EEC(c)-2/EWA(h)
Pn-4/Po-4/Pe-5/Pq-4/Pac-4/Pg-4/Pae-2/Peb/Pi-4/Pk-4/Pl-4/Pb-4 AFMD(t)/RAEM(t)/
ACCESSION NR: AP4043250 ASD(m)-3/AS(mp)-2/ S/0203/64/004/004/0668/0674
AFETR/AFMDC/ESD(t)/ASD(p)-3/ESD(c)/SSD/ASD(a)-5/AFTC(a)

AUTHOR: Mityakova, E. Ye. AST/GW/WS

TITLE: Measurements of electron concentrations in the ionosphere based on observations of the Faraday effect of the radio signals of artificial earth satellites

SOURCE: Geomagnetizm i aeronomiya, v. 4, no. 4, 1964, 668-674

TOPIC TAGS: ionospheric electron concentration, electron concentration, Faraday effect, artificial earth satellite, artificial earth satellite signal, satellite signal

ABSTRACT: It is suggested that one of the possible methods of determining electron concentrations in the ionosphere is the method based on amplitude recordings of radio signals received from artificial earth satellites. In this connection, methods of processing the Faraday fadings of these signals in order to determine electron concentrations for a vertical column of an even cross section are established, and the respective formulas and the limits

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ACCESSION NR: AP4043250

of their application are derived. The method is applied to signals received from Cosmos-1 and Cosmos-2 in the Crimea (March-April 1962) and from Explorer-VII in Gorky (beginning of 1962). It is concluded that although the processing involving Faraday-effect recordings is not as accurate as the processing which involves phase recording, the amplitude method has, nevertheless, the advantage of simplifying the experiment which takes place in the course of regular observations. Orig. art. has: 4 figures, 3 tables, and 17 formulas.

ASSOCIATION: Radiofizicheskiy institut, Gor'kovskiy gosudarstvenny*y universitet (Institute of Radio Physics, Gorky State University)

SUBMITTED: 11Dec63 ATD PRESS: 3105 ENCL: 00

SUB CODE: AA, EM NO REF SOV: 005 OTHER: 008

Card 2/2

9.9120 (also 1041, 1046)
9.9400

S/141/60/003/006/004/025
E032/E114

AUTHORS: Mityakova, E.Ye., Mityakov, N.A., and Rapoport, V.O.

TITLE: On the Measurement of the Electron Concentration in the Ionosphere and in Interplanetary Space

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol.3, No.6, pp. 949-956

TEXT: A brief review is given of the available methods for the determination of the electron concentration in the ionosphere with the aid of artificial earth satellites. Using the quasi-longitudinal approximation, an expression is obtained for the phase and group paths for a signal emitted from an artificial earth satellite towards a spherical earth. It is shown using the results of Al'pert et al (Ref.11) that the phase path length is given by

$$n_{1,2}^2 = 1 - \frac{4\pi e^2 N}{m\,\omega(\omega \pm \omega_L)} = 1 - \frac{2aN}{\omega(\omega \pm \omega_L)} \qquad (1)$$

and

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E032/E114

On the Measurement of the Electron Concentration in the Ionosphere and in Interplanetary Space

$$L_{\phi 1,2} = r_0 - \frac{a}{\omega \cos \chi}\left[\int_0^{z_0} \frac{N}{\omega \pm \omega_L} dz - \mathrm{tg}^2 \chi \int_0^{z_0} \frac{Nz}{R_0(\omega \pm \omega_L)} dz\right]. \quad (5) \qquad (5)$$

and the group path length is given by

$$L_{rpl,2} = \int_A^B \frac{\partial (n_{1,2}\, \omega)}{\partial \omega} d\ell_{1,2} \qquad (6)$$

and

$$L_{rp1,2} = r_0 + \frac{a}{\omega \cos \chi}\left[\int_0^{z_0} \frac{N}{\omega \pm \omega_L} dz - \mathrm{tg}^2 \chi \int_0^{z_0} \frac{Nz}{R_0(\omega \pm \omega_L)} dz\right]. \quad (7) \qquad (7)$$

In these expressions $\omega_L = (eH_0/mc) \cos \gamma$, γ is the angle between the earth's magnetic field and the wave normal, suffix 2 and the "minus" sign refer to the ordinary wave, and suffix 1 and
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S/141/60/003/006/004/025
E032/E114

On the Measurement of the Electron Concentration in the Ionosphere and in Interplanetary Space

the "plus" sign to the extraordinary wave. Furthermore, N is the electron concentration, z_0 is the distance from the earth's surface, r_0 is the true distance from source to receiver, R_0 the earth's radius, and χ is the zenith angle of the satellite (see Fig.1). These two path lengths differ from the true distance r_0 by the same amount $c_{1,2}$. The above expressions can be used in a method whereby the electron concentration is determined by measuring the angle between the planes of polarization and the difference between the group path lengths on two frequencies. The combination of these two measurements is suggested as a possible approach to the measurement of the electron concentration in interplanetary space with the aid of cosmic rockets. To measure the electron concentration in interplanetary space it is necessary to have signals on frequencies ω_1, ω_2, ω_3 which are modulated at a low frequency Ω. The close frequencies ω_1 and ω_2 can be used to measure the Faraday effect and hence the contribution to $\int_0^{r_0} N\,dr$

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S/141/60/003/006/004/025
E032/E114

due to the ionosphere, and the distant frequencies ω_1 and ω_3 to measure the difference in the group path lengths. In order that the contribution due to interplanetary space should be comparable to that due to the ionosphere, the rocket must be at a distance of 10^6 km from the earth. The reception of signals from such distances is difficult because of the low power of the transmitters on rockets. This difficulty can easily be avoided by the use of a sinusoidally modulated signal.

Acknowledgments are expressed to G.G. Getmantsev and V.L. Ginzburg for valuable advice.

There are 1 figure and 14 references: 6 Soviet and 8 non-Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of the Gor'kiy University)

SUBMITTED: April 2, 1960

MITYAKOV, N.A.; MITYAKOVA, E.Ye.

Methodology of studying the ionospheric structure by way of ground reception of radio signals from artificial satellites. Geomag. i aer. 3 no.5:858-867 S-O '63. (MIRA 16:11)

1. Radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete.

L 2965-66 EWT(d)/FSS-2/EWT(1)/FS(v)-3/EPA(sp)-2/EEC(k)-2/FSS/EWA(d)/EWA(h)

ACCESSION NR: AT5023576 AST/TT/GS/GW UR/0000/65/000/000/0147/0150

AUTHOR: Yerukhimov, L. M.; Mityakov, N. A.; Mityakova, E. Ye. 69 B+1

TITLE: Investigation of the ionosphere by the method of ground reception of radio signals from artificial earth satellites

SOURCE: Vsesoyuznaya konferentisya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 147-150

TOPIC TAGS: ionosphere, ionospheric inhomogeneity, electron density, artificial satellite observation

ABSTRACT: A summary of research on the regular ionospheric structure, large-scale inhomogeneities of electron concentration, and small-scale ionospheric inhomogeneities is presented. The research in question has been conducted since 1961 using artificial earth satellites (Elektron-1 included). The regular structure of the ionosphere was studied by the measurement of the phase difference of coherent frequency signals (20—90 Mc) and the Faraday fading of 20-Mc signals from the satellites. According to data from Cosmos-1, Cosmos-2, and Explorer-7, electron concentration

L 2965-66

ACCESSION NR: AT5023576

as a function of the altitude of the satellite and the time of day was in the range 0.1—1.7 x 10^{13} el/cm^2. The corresponding average value for the exponent index k was 6.2 x 10^{-3}/km. The index was determined from comparisons with vertical probing data under the assumption that the electron concentration above the F layer behaves exponentially. The measurements of large-scale inhomogeneities indicated that their dimensions range from a few kilometers to a few hundred kilometers. The gradient

$$\Delta \int_0^{z_0} \frac{\partial N}{\partial z} dz \approx 10^4 \ \mathrm{el/cm^3}$$

is independent of the nonuniformity dimension ℓ for $\ell > 100$ km. For $\ell < 100$ km, this gradient increases with ℓ. Small-scale inhomogeneities were determined from the fluctuation of signals received at three spatially dispersed antennas. It was established that they have a clearly expressed daily course, with the maximum occurring at night. They were observed primarily at 250—350 km and ranged in size from 1 to 2 km. Orig. art. has: 1 formula. [BD]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: ES, EC

NO REF SOV: 008 OTHER: 001 ATD PRESS: 4109

Card 2/2 BVK

L 23430-66 EWT(d)/FSS-2/EWT(1)/EEC(k)-2/FCC/EWA(d)/EWA(h) ASI/II/GW

ACC NR: AP6012830 SOURCE CODE: UR/0293/66/004/002/0249/0256

49
41
B

AUTHOR: Mityakov, N. A.; Mityakova, E. Ye.; Cherepovitskiy, V. A.

ORG: none

TITLE: Results of a study of the distribution of electron concentration in the ionosphere by a method of ground reception of radio signals from Electron-1

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 2, 1966, 249-256

TOPIC TAGS: ionosphere, ionospheric electron concentration/Electron 1

ABSTRACT: The total electron concentration in the ionosphere above the maximum of the F layer was determined from ground reception of signals of Electron-1 transmitted at 20.005 and 30.0075 Mc. Observations were made during February—March 1964 at Gorky and in the Crimea with equipment capable of recording the phase difference of coherent-frequency signals. Standard PKCh-3 equipment, described earlier by Ya. L. Al'pert et al., was employed in the Crimea, while special equipment capable of recording signal amplitudes and phase differences at coherent frequencies of 20, 30, 40, and 90 Mc was developed for use at Gorky. Standard R-250 M receivers were employed. Signals from a coherent reference heterodyne were also fed to the receivers. In the presence of satellite signals, low-frequency beats were generated at the output of the receivers. After passing through narrow-band filters, the low-frequency signals were fed to a phase meter, where they were brought to a single frequency of 9 kc. On the basis of recorded phase differences, total electron concentration was

2

Card 1/3 UDC: 550.388.1

L 23430-66

ACC NR: AP6012830

determined to altitude z_c of the satellite from the following formula:

$$N_{nc} = \int_0^{z_0} N dz,$$

where N_{nc} is the vertical profile of the ionosphere passing through a point at which radio beams intersect with the maximum of the F layer. Curves showing the diurnal variation of N_{nc} for various intervals of geographic latitudes are given in the

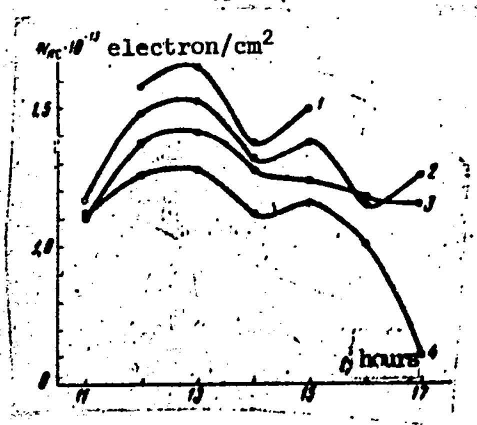

Fig. 1. Diurnal variation of the electron concentration for various geographic latitudes

1 - 51—53°; 2 - 53—55°; 3 - 55—57°; 4 - 57 to 60°.

figure. The total electron concentration was found to increase in the southward

Card 2/3

L 23430-66

ACC NR: AP6012830 8

direction. In conclusion, the authors avail themselves of the opportunity to thank T. I. Makarov and S. K. Malyshev for their participation in the development and preparation of the equipment; L. M. Barsukov, V. A. Vasin, and L. I. Grekov for their assistance in processing the material; and L. V. Piskunov and A. V. Potemkin for computing the ephemerides of the satellites. Orig. art. has: 6 figures and 1 table. [JR]

SUB CODE: 04, 17/ SUBM DATE: 05Jun65/ ORIG REF: 006/ OTH REF: 005/ ATD PRESS: 4236

Card 3/3

MAKKAVEYEV, N.I., prof.; LAPTEV, M.I.; MITYAKOVA, M.N.; KONDRAKHOVA, Ye.I.; SHANKIN, P.A.; RZHANITSYN, N.A.; RABKOVA, Ye.K.; VYKHLOV, K.P.; CHALOV, R.S.

[Planning the navigable channels of unregulated rivers.] Proektirovanie sudovykh khodov na svobodnykh rekakh. Moskva, Transport, 1964. 261 p. (Moscow. TSentral'nyi nauchno-issledovatel'skii institut ekonomiki i ekspluatatsii vodnogo transporta. Trudy, no. 36). (MIRA 18:12)

BERDINSKIY, I.S.; MITYANIN, V.P.

Synthesis of unsymmetrical diphenylhydrazides of carboxylic acids. Trudy Perm. farm. inst. no.1:159-161 '59. (MIRA 15:1)

1. Permskiy farmatsevticheskiy institut, kafedra organicheskoy i biologicheskoy khimii. (HYDRAZIDES)

[illegible]

MITYANINA, I.V.

The stratigraphic significance of formanifera of Jurassic deposits in southeastern White Russia. Paleont. i stratigr. BSSR no.1:108-173 '55. (MIRA 10:1)

(White Russia--Forminifera, Fossil)

5-3-12/37

AUTHOR: Mityanina, I.V

TITLE: Stratigraphy of Jurassic Sediments in Belorussia According to the Study of Foraminifera Data (Stratigrafiya yurskikh otlozheniy Belorussii po dannym izucheniya foraminifer)

PERIODICAL: Byulleten Moskovskogo Obshchestva Ispytateley Prirody, Otdel Geologicheskiy, 1957, # 1, p 177 (USSR)

ABSTRACT: The Middle- and Upper-Jurassic sediments in Belorussia are widespread in the Pripyat depression, in the western part of the Moscow depression and in the Brest depression of the L'vov syncline. The Upper-Jurassic system is represented by Callovian and Oxford sediments. The author describes various sediments and species of foraminifera characteristic of them.

AVAILABLE: Library of Congress

Card 1/1

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R001134810003-0"

MITYANINA, I.V.

New data on Jurassic sediments of Grodno Province. Dokl. AN BSSR 3 no.5:217-219 My '59. (MIRA 12:10)

1. Predstavleno akademikom AN BSSR I.S. Lupinovichem.
(Grodno Province--Geology, Stratigraphic)

MITYANINA, I.V. [Mitsianina, I.V.]

Stratigraphy of Jurassic sediments of White Russia. Vestsi AN BSSR.Ser.fiz.-tekh.nav. no.4:104-107 '59. (MIRA 13:4)

(White Russia—Geology, Stratigraphic)

MITYANINA, I.V.

Stratigraphic division of the Jurassic of White Russia. Trudy VNIGNI no.29:91-95 vol. 2, '61. (MIRA 14:7)
(White Russia—Geology, Stratigraphic)

MITYANINA, I.V.

Foraminifers of the Upper Oxfordian in White Russia. Paleont.i stratigr. BSSR no.4:122-189 '63. (MIRA 17:4)

Mityanskiy, G.F.

AUTHOR: Mityanskiy, G.F. 109-12-3/15

TITLE: Migration of Barium on the Surface of Certain Metals (Migratsiya bariya po poverkhnosti nekotorykh metallov)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, No.12, pp. 1491 - 1496 (USSR).

ABSTRACT: The problem was already considered by several authors, in particular, by Drechsler (Ref.6) and Schaefer and White (Ref.7). A more extensive investigation of the problem was carried out by the author and the results are reported in this paper. The measurements were carried out by means of a cylindrical thermo-electronic projector (Ref.10). A mixture of barium beryllate and tantalum powder was used as the source of barium in the investigated tube, in which the pressure was initially reduced to 5×10^{-8} mmHg. The tube was then sealed off and the pressure reduced to about 2×10^{-9} mmHg. The cathode was in the form of a filament and it was coated with a multi-atomic layer of barium. Theoretically, the process of the migration of barium can be represented by:

$$x^2 = 4D_T t$$

where x is the displacement of the boundary of the barium

film, t is the time necessary to produce the displacement and D_T is the value of the migration coefficient at a given temperature T of the filament. If D_T is measured at several temperatures, it is possible to obtain the value of the activation energy of the migration, Q_M, and a constant D_∞ which are related by equation:

$$D_T = D_\infty e^{-\frac{Q_M}{kT}}.$$

The measurements were carried out on filaments having a length of 180 mm and a diameter of 0.1 mm and the following curves for the barium layers on pure tungsten were taken: $1/4x^2$ as a function of t (Fig.1), distribution of D_T along the filament and D_T against $1/T$ (Figs. 2 and 3). Similar measurements were made for barium layers on carburised tungsten, rhenium-coated tungsten and platinum-coated tungsten. It is concluded that the values of D_T and Q_M for the barium migration on pure tungsten, carburised tungsten and rhenium-coated tungsten differ very little

Migration of Barium on the Surface of Certain Metals

over the investigated range of temperatures (940 to 1 400 °K). On platinum-coated tungsten, the migration coefficient is larger and the activation energy is lower than that of the other three metals; in platinum, the migration of barium is faster than in other metals, especially at comparatively low temperatures. The author thanks Prof. N.D. Morgulis for directing this work. There are 4 figures, 1 table and 15 references, 2 of which are Slavic.

ASSOCIATION: Physics Institute of the Ac.Sc. Ukrainian SSR, Kiyev. (Institut fiziki AN USSR, g. Kiyev)

SUBMITTED: May 8, 1957

AVAILABLE: Library of Congress

Card 3/3

ELECTRON PHYSICS

"Migration of Barium on the Surface of Certain Metals" by G. F. Mityanskiy Institute of Physics Academy of Sciences, Ukrainian SSR Kiev. Radiotekhnika i Elektronika, No 12 December 1958 pp 1491-1496.

Using a cylindrical thermionic projector at high vacuum (pressure less than 3×10^{-9} mm mercury), a comparative study is made of the migration of barium on the surface of pure tungsten carbided tungsten tungsten coated (electrolytically) by a layer of rhenium, and tungsten covered with a coating of platinum.

Card: 1/1

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S/185/60/005/001/006/013
A151/A029

9.4160 (3201,1003,1105)
26.1512

AUTHORS: Borzyak, P G ; Marchuk, P.M.; Mityans'kiy, O.F.

TITLE: Photo-Electronic Emission of the Intermetallic Compounds Mg_2Sn and InAs

PERIODICAL: Ukrayins'kyy Fizychnyy Zhurnal, 1960, Vol. 5, No. 1, pp. 65 - 74

TEXT: Only the spectral characteristics of the photo-effect of the $A^{II}B^{IV}$ and $A^{III}B^{V}$ - type compounds are studied which are characterized by small, one-order widths of the restricted energy zone. The films Mg_2Sn were obtained by means of the condensation of a tungsten strip cleaned in a vacuum. For studying the film of a changeable composition of Mg - Sn, the distribution of the thermo-electronic effect of the yield φ_{temp} [ABSTRACTOR'S NOTE: Subscript temp (temperature) stands for the original T (temperatura)] along the strip 5 was determined. The results are given in Figure 3, where the curve 1 shows the distribution of φ_{temp} along the surface of the tungsten strip. Further, the film was applied on the strip, which again was cleaned in a vacuum. After that, the curve 2 was obtained. A repetition of this cycle yielded a curve which coincided with the curve 2. After a third investigation of the film, a distribution was obtained for it which

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Photo-Electronic Emission of the Intermetallic Compounds Mg_2Sn and InAs

is illustrated by the curve 3. For various sections of the film characterized
by the curve 3, the authors have determined the spectral p to-electric sensi...
ty I_1 toward I_2 of the Cs_3Sb-photocathode: $\frac{I_1}{I_2} = (\lambda)$ The results are shown ...
Figure 4. Each curve is marked by a figure being the coordinate of the invest...
ed section according to the data of Figure 3. The photo-electronic properties of
Mg are characterized by the curve 28, those of Mg_2Sn by the curves 10, 13 and ...
It was established that the optimum value of the yield effect in respect to the
photo-electronic emission is achieved for a metal surface at values t within the
limits 4-20 and for the surface of Mg_2Sn at $t \approx 70$. It can also be seen that in
the case of a photoelectronic yield effect of only about 2 ev, the values of the
quantum yield in Mg_2Sn remain small, reaching only the tenth part of a percent
even at the highest values of $h\nu$ = 5 ev For studying the photo-electronic emis-
sion of InAs, an investigation was carried out of the surface of the break of a
massive crystalline sample obtained in a high vacuum. The results of photo-elec-
tric measurements conducted on a clean, newly-obtained surface are shown by dots
on the curve 1 in Figure 7. In the case of a consecutive deposition of BaO mole-
cules on the surface of InAs the yield effect is increasing, according to which
the characteristics 2,3 are obtained. The curve 4 corresponds to a ...

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S/185/60/005/001/004/014
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...o-Electronic Emission of the Intermetallic Compounds Mg_2Sn and InAs

...face with a concentration of barium oxide molecules which is already higher ... the optimum concentration. For comparison Figure 7 depicts also the curve ...tained for a Cs_3Sb-photocathode, which at λ = 400 mμ had a quantum yield of ... 18%. A comparison of the spectral characteristics of the 3 intermetallic compounds Mg_2Sn, InAs and Cs_3Sb shows that the first two compounds differ from the latter one by efficiency values and appearance. Even at a distance of 3 ev from the border, they do not show any tendency to saturation and have lesser efficiencies than Cs_3Sb by one order or more. By making a comparison of the values $\Delta\varphi = \varphi - \varphi$ for Mg_2Sn, InAs, and Cs_3Sb (Ref. 7) including here the data for Ge (Ref. 8) the tendency toward a decrease of $\Delta\varphi$ is noted which occurs when the energy of the electronic affinity is also decreasing. There is, however, no direct proportional relationship between the electronic affinity and $\Delta\varphi$, which shows that there are still other factors affecting the value $\Delta\varphi$. There are 8 figures, 2 tables and ... references: 6 Soviet, 1 English and 1 German.

ASSOCIATION: Instytut Fizyky AN URSR (Institute of Physics, AS UkrSSR).

SUBMITTED: July 6, 1959

Card 3/5

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S/185/60/005/001/006/[illegible]
A151/A029

Photo-Electronic Emission of the Intermetallic Compounds Mg_2Sn and InAs

Figure 3:

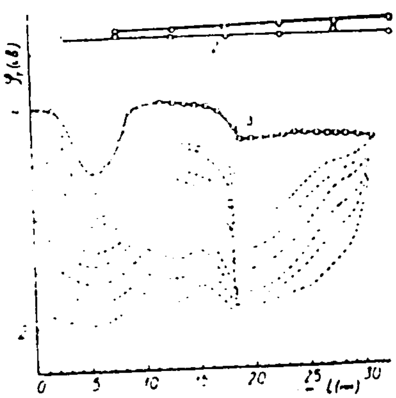

Рис. 3

Figure 4:

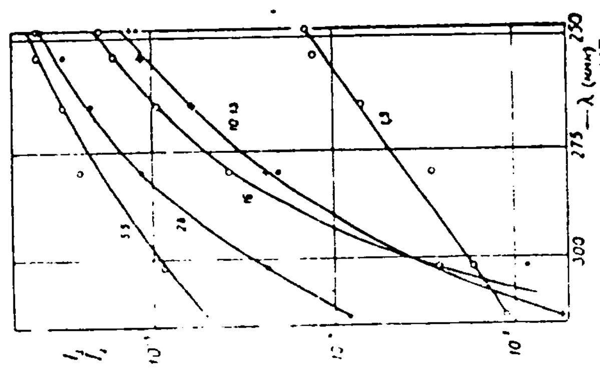

Рис. 4

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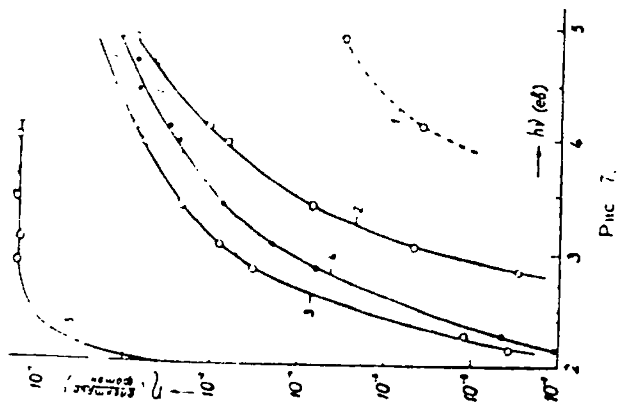
...to-Electronic Emission of the Intermetallic Compounds Mg_2Sn and InAs

...ure 7:



Card 5/5

MITYASHEV, B.N.

Noiseproof feature of one method for time discrimination of pulse signals. Nauch.dokl.vys.shkoly; radiotekh. i elektron. no.2:7-12 '58. (MIRA 12:1)

1. Kafedra radiotekhniki Moskovskogo fiziko-tekhnicheskogo instituta.
(Radio frequency modulation--Receivers and reception)

SOV/162-58-3-4/26

9(4)

AUTHORS: Mityashev, B.N., and Tsirlin, A.I.

TITLE: Reducing the Influence of Sinusoidal Noise on the Pulse Signal Reception (Ob umen'shenii vliyaniya sinusoidal'noy pomekhi na priyem impul'snykh signalov)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Radiotekhnika i elektronika, 1958, Nr 3, pp 25-32 (USSR)

ABSTRACT: The authors investigate the sine noise suppression with pulse signal reception and suggests a synchronous oscillator which produces oscillations close to the noise frequency. However, according to Ye.I. Manayev, this oscillator frequency will not be synchronous to the noise frequency. Figure 4 shows a block diagram of such a synchronous noise suppressor. A self-oscillator producing sine oscillations may be used as a synchronous generator. The block diagram of such a generator is shown by figure 6. The experimental device built according to this block diagram was somewhat bulky, containing seven vacuum tubes and

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SOV/109-3-9-4/...

AUTHOR: [illegible]

TITLE: Transfer of the Fluctuation Noise and Pulse Signal Through a Time Discriminator (Prokhozhdeniye fluktuatsionnoy pomekhi i impul'snogo signala cherez vremennoy diskriminator)

PERIODICAL: Radiotekhnika i elektronika, 1958, Vol 3, Nr 9, pp 1144-1157 (USSR)

ABSTRACT: The discriminator considered consists of: 1) 2 selector stages, 2) 2 integrators, and 3) a difference amplifier (see Fig.1). The 2 selector stages of the system operate in such a way that two "segments" of the input pulse are produced (see Fig.). The two segments are applied to the integrators which give outputs proportional to the areas of the segments. [illegible]

Card 1/6 [illegible]

[illegible] Fluctuation Nois[illegible] Signal Tr[illegible] Time Di[illegible]

$$u_S = k \int_{t_0}^{t_0+T} u(t)\,dt \qquad (1)$$

where $u(t)$ [illegible] the volt[illegible] of the [illegible], t_0 [illegible] ance of a [illegible] and k is a coefficient [illegible] assumed to be equal to unity. In order to deter[illegible] dispersion of the fluctuati[illegible] is consi[illegible] rator, a quantity defined by E[illegible] dispersion of t[illegible] quantity [illegible] where σ^2 is the dispersion of [illegible] $r(\tau)$ is the correlation funct[illegible]. From the [illegible] it follows that the dispersion of the signal u_S is given by:

Card 2/[illegible]

Transfer of the Fluctua[illegible] Signal Th[illegible] Time Discriminator

$$\sigma_S^2 = \sigma^2 T^2 \gamma_T^2 \qquad (7)$$

where γ_T^2 is defined by Eq.(5). If the spectrum of the input signal is ΔF_0, which is a comparatively small quantity, the coefficient γ_T^2 is expressed by Eq.(8). If the input signal is obtained from a [illegible] detector [illegible] bandwidth Δf_0, its correlation function is defined by Eq.(11), where the coefficients b_1 and b_2 are determined from Eq.(1[illegible]), where $\rho(\tau)$ is the [illegible] noise correlation function, $q = U_0/\sigma_0$ is the [illegible] J and J [illegible] [illegible] Bessel functions [illegible] [illegible] function [illegible] by Eq.(1[illegible]). [illegible] γ_T^1 [illegible] γ_T^{11} are [illegible] defined by Eq.(12) and (1[illegible]) [illegible] signal

Card 3/[illegible]

Transfer of the Fluctuation ... Discriminator

At the input of the detector ... the coefficients γ_1' ... γ_1'' ... filter, ... for a simple resonant circuit, ... Eq.(30) and (31). The coefficients γ_1' ... γ_1'' ... cases are plotted in Fig.4 ... (full curves). A ... of the ... Eq.( ). ... σ ... γ_1' ... fluctuation ... given by Eq.( ) or $T_1 = T_2 = T_3$ ... by Eq.(37), where σ_1 is the ...

Card 4/5

S07/10 -3-9-4/20

Transfer of the Fluctuation Noise and Pulse Signal Through the Time Discriminator

integrator. From Eqs.(37) and (38) it is seen that the mutual correlation coefficient of the system is expressed by Eq.(39). The value of this coefficient for the three types of filter are plotted in Fig.7. If the discriminator receives pulse signals and the fluctuation noise, the analysis of the system can be carried out by considering the conditions in three distinct regions; these are indicated in Fig.8. For this case, the dispersion of the output signal for region 1 is given by Eq.(40); in region 2 the dispersion is expressed by Eq.(4) while in region 3 it is given by Eq.(44) or Eq.(45). The resultant dispersion ... by Eq.(46). The ... noise at the output ... the discriminator can be ... value ... voltage ... Eq.(47), ... u_c ...

... 5/ ...

[illegible]

D[illegible]

[illegible] for [illegible] ob-
servations. T[illegible]
[illegible].

SUBMITTED: J[illegible]

[illegible]

MITYASHEV, B.N.

AUTHOR: Mityashov, B. N., Member of the Society

TITLE: Method for the Improvement of the Demodulation Accuracy of Pulses (Metod povysheniya tochnosti demodulyatsii impul'sov)

PERIODICAL: Radiotekhnika, 1958, Vol 13, Nr 5, pp 55-63 (USSR)

ABSTRACT: Here a new method for the demodulation of pulses is shown, which was worked out by the author, and by which compared with the otherwise usual method a considerably better demodulation accuracy is reached. In the new method it is suggested to form a response (in its shape an isosceles triangle) for each signal pulse. The amplitude of these triangular pulses must be proportional to the amplitude of the signal pulses and the duration at the base must be equal to the two repetition periods. As a result of the superposition of such responses a signal is obtained in which the voltage from one amplitude value to the other changes according to a straight line. On this occasion the output signal is retarded for one repetition period with regard to the modulating function. By this the accuracy of the

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Method for the Improvement of the Demodulation Accuracy of Pulses

demodulation is better. The reproduction accuracy is particularly high in those parts of the modulated function where the curvature is very flat. By means of low frequency filters in this method the also demodulation accuracy can be increased. The magnitude of the gain in demodulation accuracy in this method is evaluated. From the obtained tables can be seen that in case of additional connection of the filters the accuracy of the demodulation improves. The value of the relative gain in accuracy, however, remains the same as in the case when filters are not used. The data given in the tables also show the error magnitudes in the reproduction of a modulating function with pulse character. Two demodulator schemes are given:
1) With formation of triangular pulses and
2) with formation of a growth function. The first type remains more complicated in spite of all simplifications than the scheme of the usually applied step-demodulator. Besides, the characteristics of both demodulator channels must be equalized. The second type is free from both deficiencies. In this the linear approximation of the

Card 2/3

В. С. [illegible]

О пропускной способности многолучевых каналов связи

Ю. Н. Мартынов

К теории корректирующих кодов

10 июня

(с 10 до 16 часов)

А. Е. Башаринов,
Б. С. Флейшман,
Г. С. Тихомиров

Метод последовательного анализа в задачах обнаружения сигнала в многоканальных системах

Н. Л. Теплов

Элементы теории потенциальной помехоустойчивости систем с дискретными сигналами

В. И. [illegible]

О помехоустойчивости одного способа определения [illegible] положения импульсов

Г. А. Сергеев

К вопросу об оптимальной обработке интервальных данных

10 июня

(с 18 до 22 часов)

Ю. С. Лезин

О [illegible] сигналах при [illegible] канале с [illegible] функцией

В. Е. [illegible]

Новые принципы анализа спектров

Г. А. [illegible]

Помехоустойчивость приемника с [illegible] временем восстановления (случай простейшего потока [illegible] сигналов)

Н. Н. Кузнецов

О помехоустойчивости [illegible] телеметрических сообщений

11 июня

(с 10 до 16 часов)

А. Е. Башаринов

Нарастающая вероятность обнаружения [illegible] переменной длительности

Л. И. [illegible]

Нелинейные радиоприемные устройства [illegible] сигналов

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORiE), Moscow, 8-12 June. 1959

AUTHOR: Mityashev, B.N. SOV/109-4-4-10/24

TITLE: Noise Suppressibility in the Time Discriminators of Pulse Signals (O pomekhoustoychivosti vremennogo diskriminirovaniya impul'snykh signalov)

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 4, pp 637 - 647 (USSR)

ABSTRACT: In an earlier work (Ref 1), the author carried out an analysis of the pulse signal-plus-noise transfer through a discriminator. The device consisted of two gating stages, two integrators and an adding circuit. The discriminator could be used to determine the position of the signals as a function of the perturbing noise. Here, the accuracy of the instrument is analysed in some detail. When a signal and noise are applied to the discriminator, the slope and the zero of the characteristic of the device are shifted. When the signal-to-noise ratio is small, the average square error of the discriminator is defined by:

$$\Delta\tau_{d0} = \frac{\sigma_d}{S_{d0}} \qquad (1)$$

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where σ_d is the average square value of the noise at the output of the discriminator and S_{d0} is the slope of the characteristic. For large signal-to-noise ratios, a linear approximation can be used and the average square error is given by:

$$\Delta\tau_d = \frac{\sigma_d}{S_d} \qquad (2)$$

where $S_d = U_{mcd}/\Delta t_m$ is the average slope of the operating region of the discriminator characteristic. Here, Δt_m is the mismatch of the system, when the output voltage has a maximum value U_{mcd} (Figure 1). When the gating pulses are comparatively long, i.e. when their duration T is longer than the rise time T_d of the signal pulse, the average the coefficients b_1 and b_2 are determined by Eqs (10). The quantity $q = 1/p$ in Eq (9) represents the signal-to-noise ratio at the input of the detector. When the bandwidth of the receiver is comparatively large, the output noise is expressed by Eq (15). The error of the discrimination is therefore given by Eq (16), where K represents the characteristic of the detector, while Δf_0 is the bandwidth of the receiver. When the duration of the gating pulses is less than the rise time of the signal pulses, the output noise of the discriminator is written as Eq (24) where σ^2 represents the noise at the input of the system. If the bandwidth is such that $\Delta f_0 T_c$ is greater than 2, the noise at the output is given by Eq (27). Consequently, for small noise levels, the error in the discrimination is given by Eq (28). In general, the error is expressed by Eq (29). N_0 in Eq (29) denotes the spectral density of the noise at the input of the filter. The analysis of the

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Noise Suppressibility in the Time Discriminators of Pulse Signals

formulae obtained in this work shows that the highest signal-to-noise ratio at the output of the receiving system is obtained when the duration of the gating pulses is equal to that of the signal pulses. When the signal pulses have steep edges, the accuracy of the system can be increased by reducing the duration of the gating pulses. The discrimination accuracy in the case of small noise levels is almost equal to the theoretical maximum, especially when the bandwidth of the filter preceding the detector is inversely proportional to the rise time of the pulse signals and the duration of the gating pulses is equal to the rise time. The author expresses his gratitude to Professor Ye.I. Manayev for constructive criticism of this work. There are 5 figures and 9 references, 1 of which is English and 8 Soviet. One Soviet reference is translated from English.

SUBMITTED: October 16, 1957

Card 4/4

..9000

AUTHOR: Mityashev, B. N.

TITLE: Concerning the Optimum Method of Pulse Time Location

PERIODICAL: Radiotekhnika ... pp 200-... (USSR)

ABSTRACT: While there are ... for the time-location of pulses, filter ... maximum accuracy. However, ... maximum accuracy ... article describes these methods ... level noises ... with maximum ...

(1) Time Discrimination of Pulses. E... are obtained with time discriminator ... error signal ... rectangular ...

Card 1/4 width T, ... filter with ...

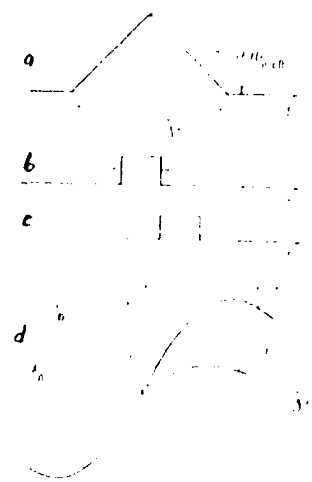
will be [illegible]
A signal [illegible]
triangular shape [illegible]

the distr[illegible]
that the signal [illegible]
triangular shape per F[illegible]
from the [illegible]
which [illegible]
noise [illegible]
signal [illegible] = $\sqrt{\ }\sigma$ [illegible] (σ [illegible]
detector [illegible]). [illegible] << [illegible] , K [illegible] ≃ [illegible]

Λ_n [illegible]

(4) Let the [illegible]
of equal dur[illegible]
[illegible], [illegible]). The [illegible]

[illegible] Optimum Method [illegible] P[illegible]
[illegible] Direction



[illegible]

[illegible] Optimum M[illegible] P[illegible]

[illegible]

Differen[illegible]

[illegible] Δ [illegible]

[illegible]

where σ [illegible]

[illegible] γ [illegible] γ [illegible]

[illegible]

Concerning an Optimum Method of Pulse Time Temporary Location

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$$\gamma_T^2 = \frac{2}{T^2}\int_0^T (T - \tau)\, r(\tau)\, d\tau. \quad (7)$$

where r (τ) is correlation coefficient of the noise. The dependence of coefficients $\gamma_T'^2$, $\gamma_T''^2$ (high and low ratio noise-to-signal, respectively) and of differences $2(\gamma_T'^2 - \gamma_{2T}'^2)$ and $2(\gamma_T''^2 - \gamma_{2T}''^2)$ on T/T$_0$ are shown in Fig. 2.

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Concerning an Optimum Method of Pulse Time Temporary Location

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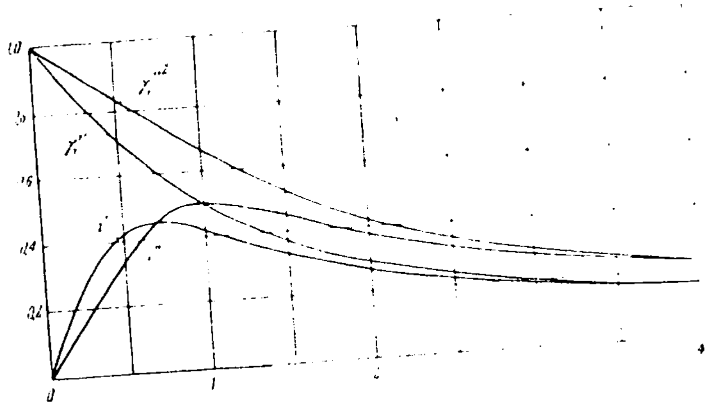

Fig. 2. Coefficients γ_T', γ_T'', $a' = 2(\gamma_T'^2 - \gamma_{2T}'^2)$ and $a'' = 2(\gamma_T''^2 - \gamma_{2T}''^2)$ vs. ratio T/T$_0$.

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The effective filter bandwidth (1) is $\Delta f_c = 1/T_c$ and, therefore, $T/T_c = \Delta f_c T$. The RMS time error of tracking caused by the noise is:

$$\Delta\tau_c = \frac{\sigma_d}{S_{d0}} \frac{1}{\sqrt{n}}. \qquad (13)$$

Here, σ_d is given by Eq. (...), and the discriminator characteristic steepness S_{d0} by Eq. (...); n is number of signal pulses. Since the effective transmission band of filter (1) is $1/T_c$ for the spectral noise density at the filter input N_0, then $\sigma_0^2 = N_0/T_c$, and therefore

$$\Delta\tau_c = \frac{1}{\sqrt{3}} \frac{\sqrt{N_0 T}}{U_{mc0}} \frac{1}{\sqrt{n}}. \qquad (17)$$

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Con[illegible]ing an Optimum Method of Pulse Time[illegible] SOV/[illegible]
Temporary Location

The error magnitude decreases here with [illegible]
pulse duration. The permissible [illegible]

$$\frac{\sigma_d}{\sqrt{n}} = U_{med}. \qquad (18)$$

For small T and n, from (7) (1[illegible]) (1[illegible]), [illegible]
and considering (1[illegible]), the limit [illegible]
is:

$$n_{lim} = \sqrt{\frac{3}{2}} \sqrt{\frac{T}{T_r}} \sqrt{n}. \qquad (19)$$

This formula [illegible] as long as the [illegible]
Time discrimination by narrow and [illegible]
pulses and optimal filtration of the [illegible]
as optimum operation (at low noise level). [illegible]
however, can be obtained without optimum filtr[illegible]
limit accuracy it is sufficient [illegible]
a rise time T_r pass through an ordinary filter [illegible]
$\Delta f_o = 1/T_r$ and set the width of [illegible]

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Concerning an Optimum Method of P[illegible] Time [illegible] Temporary Location

pulses equal to T_c. By a series of [illegible] the author obtains:

$$p_{bd} = 0,85\sqrt[4]{n} \qquad (21)$$

$$N_{0\,bd} = 0,37\,U^2_{mco}\,T_c\sqrt{\bar{n}}. \qquad (22)$$

Equation (21) is adequate for [illegible] is greater than unity. The magnitude [illegible] noises, where T = T_c, is:

$$\Delta\tau_c = \frac{1}{2}\frac{\sqrt{N_0 T_c}}{U_{m.o}}\frac{1}{\sqrt{n}} = 0,35\,p T_c\frac{1}{\sqrt{n}} \qquad (23)$$

Thus, a limit accuracy in the [illegible] is different from conditions of a maximum [illegible] stability. Optimum signal filtration [illegible] consolidation of these conditions. [illegible]

Card 14

achieved when $T_{i} \simeq T_{[illegible]}$. In [illegible]

of low selectivity and [illegible]

$\Delta f_{0} \simeq 1/T_{i} \simeq 1/T_{[illegible]}$ [illegible]

filter.
(2) Determination [illegible]
Maximum Value Sig[illegible]. A [illegible]
of pulses by peak [illegible] the signal [illegible]
following method [illegible] proposed: A [illegible]
mal filter and detector (Fig. [illegible]) [illegible]
u_{0} and then differen[illegible] (Fig. [illegible]) [illegible]
through an amplifier [illegible]
pulse has a shape [illegible]
sent through a differen[illegible]
negative pulse separated, [illegible]
will be [illegible] the output a pulse [illegible]
with the maximum of the signal [illegible]
correct setting of [illegible] limit[illegible]

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great degree [illegible]

Concerning an Optimum Method of Pulse Time
Temporary Location

high noise stability limit.

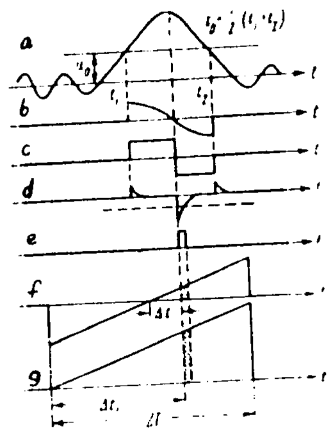

Fig. 5

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The error signal may be developed from [illegible] junction as in Fig. 3e. The error signal, [illegible] to the mistuning Δt, can be determined [illegible] and a following integration of pulses per [illegible] the multiplication being [illegible] If it is desirable to register [illegible] a voltage, the measuring pulse per [illegible] The authors determine the rms time [illegible] pulses and low noise-to-signal ratio [illegible]:

$$\Delta\tau = \frac{1}{\sqrt{2}} \frac{N_0 T_f}{U_{m0}} \frac{1}{\sqrt{n}} \qquad (21)$$

The effective passband width of an optimal [illegible] within the limits Δf = ([illegible] T_f [illegible] $T_f = 0$, and Δf = [illegible] at filter output U_m = ([illegible] can be transformed into:

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